

United States
Department of
Agriculture

Forest
Service

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Subject: Evaluation of Dwarf Mistletoe in Doolittle Creek
Drainage, Happy Camp RD (FPM Report N90-14)

To: Forest Supervisor, Klamath National Forest

On August 21, 1990, Dave Schultz and Sheri Smith, entomologists, and I visited with personnel from Happy Camp Ranger District to examine forest stands in Doolittle Creek drainage (T. 17 N., R. 6 W.), including parts of the proposed Poker timber sale. The principal concern discussed was how to manage these stands considering their level of dwarf mistletoe infestation.

Most of the stands are mixed conifer with Douglas-fir, white fir, sugar pine, and ponderosa pine being the main species. In general, Douglas-fir comprises the majority of the stocking. Most of the stands have been harvested to some extent in the past. Stand structure is made up of different proportions and densities of all size classes.

Two species of dwarf mistletoe were observed in some of the stands, Douglas-fir dwarf mistletoe, Arceuthobium douglasii, and white fir dwarf mistletoe, A. abietinum f.sp. concoloris. Douglas-fir dwarf mistletoe was causing considerable witches' broom formation in overstory trees in many areas. They are both host specific and do not threaten other tree species in this area.

Dwarf mistletoes cause a slow decline and debilitation of their hosts until tree death. It is relatively common in Douglas-fir and white fir which are heavily infected with dwarf mistletoe to have the top killed by Scolytus engraver beetles. The spike-top trees may survive in the stands for many years before dying.

In addition to their intensification and effect on individual trees, dwarf mistletoes can cause considerable stand damage by spreading from overstory trees to susceptible understory. This type of spread is limited to approximately the height of the mistletoe in the overstory tree. It is significant because of the ability of the mistletoe to continue to infect understory trees in the upper parts of their crown. These trees, therefore, never have an opportunity to add new, uninfected crown material. Suppression and deformities are normal for infected understory trees.

Minimizing the effect of dwarf mistletoes on stand growth and vigor can be readily accomplished. Altering species composition in the stand is a common approach. Removing the susceptible species and/or regenerating with non-hosts will reduce the level of dwarf mistletoe in a stand. Eradicating dwarf mistletoe from a stand is not required if the trees are free to grow and

overstory sources of infection have been eliminated. An option in a multilayered stand is to remove infected overstory trees and provide growing conditions that will promote the growth of the remaining stand. Retaining infected overstory trees, even a few per acre, with an understory of a host species will result in some of the largest impacts on growth and vigor. The appropriate options need to be determined for each stand, taking into consideration management direction for the stand, stand composition and structure, and level and location of dwarf mistletoe infection.

The following activities are suggested for addressing the dwarf mistletoe situation in Doolittle drainage.

- 1) Delineate the general area of concern and determine suitable stand boundaries. Determination of stands should be based on management and silvicultural requirements, not on the presence or absence of dwarf mistletoe, although boundaries may be adjusted to take into account dwarf mistletoe.
- 2) Mistletoe infected stands should then be surveyed to determine species, level, and distribution of dwarf mistletoe. Data collected should provide enough information to determine the effect on resources without treatment and the type(s) of treatment appropriate, if any, in an environmental analysis. The specific dwarf mistletoe data that should be collected should include tree species, tree diameter, position of the tree in the canopy, and the dwarf mistletoe rating (based on the 6 class system). In addition, general comments about stand structure and the vertical location of dwarf mistletoe in the stand may be useful. Coordinating this survey with other data collecting efforts, such as the standard cluster plot record used in stand exams (FSH 2409.21b), may provide a better perspective on how to prescribe treatments and reduce unit costs. Funds are available from FPM for dwarf mistletoe survey efforts and the Forest has applied for this source of funding in FY91 for the Doolittle Creek area.
- 3) Once this information is collected, the following can be determined for each stand: species of dwarf mistletoe present, host affected, stand dwarf mistletoe rating, position of dwarf mistletoe in the canopy, and distribution of dwarf mistletoe in the stand. This information and the stand exam information can be used to develop appropriate silvicultural prescriptions, taking into account management direction, for each stand.
- 4) FPM should be requested to do biological evaluations of specific stands where dwarf mistletoe suppression activities are being proposed. This is required when requesting FPM suppression funding (FSM 3431).
- 5) As for any project being considered, an environmental analysis should be completed to fulfill NEPA requirements.
- 6) Funding from FPM for dwarf mistletoe suppression may be requested if a viable timber sale is not possible and other sources of funding, such as KV, are not available. The following practices are appropriate (FSH 3409.11): removal of infected residual trees, sanitation exclusively for dwarf mistletoe suppression, and stand destruction where trees cannot be economically harvested (stand replacement costs are not appropriate for FPM funding, however).

7) The following documentation should be submitted to the Regional Forester for approval of any dwarf mistletoe funding request (FSM 3431 and 3432).

- a) An appropriate environmental document (EA or EIS) (see 5 above).
- b) A biological evaluation (see 4 above).
- c) An economic evaluation.
- d) A project work plan.
- e) A Forest Pest Management Project Proposal, Form FS-3400-2.

Determining the effects of dwarf mistletoes on resource health and productivity will be required during the development of an environmental analysis and economic evaluation. The most obvious effect of dwarf mistletoe is on tree and stand growth and yield. Growth and yield models are presently available for the stands examined (Klamath variant of PROGNOSIS and CACTOS) and the PROGNOSIS model includes dwarf mistletoe in its data base. The presence and level of dwarf mistletoe can be input into the model with other stand exam data to determine the effect on stand growth and yield. The effect of various prescriptions on future stand growth can be approximated with this model.

We are available to assist the District in pursuing this effort, both during presuppression efforts and during any environmental analysis and stand prescription development. If there are any questions or assistance is needed, please contact Dave Schultz or me at (916) 246-5101.

/s/ Gregg DeNitto

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